WHAT IS CLAIMED IS:

1. A method of processing pixel intensity values of a digital image, the method comprising:

clipping those pixel intensity values outside of a variable range; and

mapping those pixel intensity values within the variable range.

2. The method of claim 1, wherein the variable range for each pixel is a function of dynamic range of a local pixel neighborhood, whereby the variable range is determined on a pixel-by-pixel basis.

3. The method of claim 2, wherein the mapping is performed according to a slope that complies with the following: the slope approaches unity as the dynamic range approaches zero, the slope is greater than unity when the dynamic range is greater than zero, and the slope is a non-decreasing function of the dynamic range.

4. The method of claim 3, wherein a contrast stretching operation is performed on each pixel of interest as follows:

$$g(I)=\begin{cases} I-A\le -W & m \\ |I-A|<W & A+\dfrac{D}{2W}(I-A) \\ I-A\ge W & M \end{cases}$$

where m represents the minimum value of the neighborhood, M represents the maximum value of the neighborhood, D represent the dynamic range, D/(2W) represents the slope, I represents pixel intensity value, g(I) represents the contrast stretching operation, A represents the middle of the dynamic range, and 2W represents width of the contrast range, the contrast range being

centered about the middle of the dynamic range, the contrast range being a function of the dynamic range.

5. The method of claim 4, wherein D/(2W) = 1 + D/R, where R corresponds to dynamic scale for sharpening, whereby

$$g(I) = I + \frac{D}{R}(I - A) \quad for \quad \{|I - A| < W\}.$$

6. The method of claim 5, wherein R has a value that is constant for all pixels in the image.

7. The method of claim 5, wherein a capturing device is used to provide the digital image; and wherein R is between one-quarter and twice a range that is normalized to cover the complete dynamic range of the capturing device.

8. The method of claim 1, wherein the digital image is a color image, and wherein a luminance channel of the image is sharpened by clipping those pixel intensity values outside of the variable range; and mapping those pixel intensity values within the variable range; and wherein the sharpened luminance channel is combined with chrominance information of the image.

9. The method of claim 8, wherein the digital image is provided in RGB color space, and wherein the method further comprises using an approximation to convert the digital image from RGB color space to YCbCr color space prior to sharpening.

10. A method of sharpening a digital image, the digital image including a plurality of pixels of interest, for each pixel of interest the method comprising:

determining a dynamic range for a pixel neighborhood; and

performing contrast stretching according to the corresponding dynamic range;

whereby the contrast stretching is performed on a pixel-by-pixel basis.

11. The method of claim 10, wherein the contrast stretching is performed on each pixel of interest by clipping a pixel intensity value lying outside a corresponding contrast range and mapping a pixel intensity value lying within the corresponding contrast range, the contrast range being a function of the dynamic range.

12. The method of claim 11, wherein the mapping is performed according to a slope that complies with the following: the slope approaches unity as the dynamic range approaches zero, the slope is greater than unity when the dynamic range is greater than zero, and the slope is a non-decreasing function of the dynamic range.

13. The method of claim 12, wherein a contrast stretching operation is performed on each pixel of interest as follows:

$$g(I)=\begin{cases} I-A\le -W & m \\ |I-A|<W & A+\dfrac{D}{2W}(I-A) \\ I-A\ge W & M \end{cases}$$

where m represents the minimum value of the neighborhood, M represents the maximum value of the neighborhood, D represent the dynamic range, D/(2W) represents the slope, I represents pixel intensity value, g(I) represents the contrast stretching operation, A represents the middle of the dynamic range,

and 2W represents width of the contrast range, the contrast range being centered about the middle of the dynamic range, the contrast range being a function of the dynamic range.

14. The method of claim 13, wherein D/(2W) = 1 + D/R, where R corresponds to dynamic scale for sharpening, whereby

$$g(I) = I + \frac{D}{R}(I - A) \quad for \quad \{|I - A| < W\}.$$

15. The method of claim 14, wherein a capturing device is used to provide the digital image; and wherein the value of R is between one-quarter and twice a range that is normalized to cover the complete dynamic range of the capturing device.

16. A method of sharpening a digital image, the digital image including a plurality of pixels of interest, for each pixel of interest the method comprising performing the following contrast stretching operation on each pixel of interest as follows:

$$g(I) = \begin{cases} I - A \le -W & m \\ |I - A| < W & A + \frac{D}{2W}(I - A) \\ I - A \ge W & M \end{cases}$$

where m represents the minimum value of the neighborhood, M represents the maximum value of the neighborhood, D represent the dynamic range, D/(2W) represents the slope, I represents pixel intensity value, g(I) represents the contrast stretching operation, A represents the middle of the dynamic range, and 2W represents width of the contrast range, the contrast range being centered about the middle of the dynamic range, the contrast range being a function of the dynamic range.

17. Apparatus for processing pixels of interest in a digital image, the apparatus comprising a processor for determining dynamic ranges of pixel neighborhoods for the pixels of interest, and performing contrast stretching on each pixel of interest according to the dynamic range of the corresponding pixel neighborhood, whereby the contrast stretching is performed on a pixel-by-pixel basis.

18. The apparatus of claim 17, wherein the processor performs the contrast stretching on each pixel of interest by clipping a pixel intensity value lying outside a corresponding contrast range and mapping a pixel intensity value lying within the corresponding contrast range, the contrast range being a function of the dynamic range.

19. The apparatus of claim 18, wherein the mapping is performed according to a slope that complies with the following: the slope approaches unity as the dynamic range approaches zero, the slope is greater than unity when the dynamic range is greater than zero, and the slope is a non-decreasing function of the dynamic range.

20. The apparatus of claim 19, wherein a contrast stretching operation is performed on each pixel of interest as follows:

$$g(I)=\begin{cases} I-A\le -W & m \\ |I-A|<W & A+\dfrac{D}{2W}(I-A) \\ I-A\ge W & M \end{cases}$$

where m represents the minimum value of the neighborhood, M represents the maximum value of the neighborhood, D represent the dynamic range, D/(2W) represents the slope, I represents pixel intensity value, g(I) represents the contrast stretching operation, A represents the middle of the dynamic range,

and 2W represents width of the contrast range, the contrast range being centered about the middle of the dynamic range, the contrast range being a function of the dynamic range.

21. The apparatus of claim 20, wherein D/(2W)= 1 + D/R, where R corresponds to dynamic scale for sharpening, whereby

$$g(I)=I+\frac{D}{R}(I-A) \quad for \quad \{|I-A|<W\}.$$

22. The apparatus of claim 21, wherein an image capture device is used to provide the digital image; and wherein the value of R is between one-quarter and twice a range that is normalized to cover the complete dynamic range of the capturing device.

23. Apparatus for sharpening a digital image, the apparatus comprising a processor for determining a contrast range for each pixel of interest in the digital image, clipping intensity value of a pixel of interest if the intensity value lies outside of a contrast range; and mapping the pixel intensity value if the pixel intensity value lies within the contrast range; whereby the contrast range is determined on a pixel-by-pixel basis.

24. The apparatus of claim 23, wherein the contrast range for each pixel is a function of dynamic range of a local pixel neighborhood, whereby the processor determines the contrast range on a pixel-by-pixel basis.

25. The apparatus of claim 24, wherein the mapping is performed according to a slope that complies with the following: the slope approaches unity as the dynamic range approaches zero, the slope is greater than unity when the dynamic range is greater than zero, and the slope is a non-decreasing function of the dynamic range.

26. The apparatus of claim 25, wherein a contrast stretching operation is performed on each pixel of interest as follows:

$$g(I)=\begin{cases} I-A\leq -W & m \\ |I-A|<W & A+\dfrac{D}{2W}(I-A) \\ I-A\geq W & M \end{cases}$$

where m represents the minimum value of the neighborhood, M represents the maximum value of the neighborhood, D represent the dynamic range, D/(2W) represents the slope, I represents pixel intensity value, g(I) represents the contrast stretching operation, A represents the middle of the dynamic range, and 2W represents width of the contrast range, the contrast range being centered about the middle of the dynamic range, the contrast range being a function of the dynamic range.

27. The apparatus of claim 26, wherein D/(2W) = 1 + D/R, where R corresponds to dynamic scale for sharpening, whereby

$$g(I)=I+\frac{D}{R}(I-A) \quad for \quad \{|I-A|<W\}.$$

28. The apparatus of claim 27, wherein an image capture device is used to provide the digital image; and wherein R is between one-quarter and twice a range that is normalized to cover the complete dynamic range of the capturing device.

29. An article of manufacture for a processor, the article comprising:

computer memory; and

an image sharpening program stored in the memory, the program, when executed, causing the processor to process pixels of interest, each pixel of interest being processed by clipping its intensity value if its intensity value lies outside of a variable contrast range, and mapping its intensity value if its intensity value lies within the variable contrast range.